



pre-k for all
DC

Investing in the Economic Vitality of the District of Columbia through Pre-K for All

Technical Report

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Over the past several years, a strong national consensus has developed that high-quality pre-kindergarten is a smart investment with a high rate of return. Decades of research indicates that children who participate in high-quality pre-k are: more likely to develop strong academic and social competence and enter adulthood with the skills, knowledge, and disposition necessary to contribute to the economic growth and well being of their communities. This study examines the potential benefits to the District of Columbia if every child were given the pre-k opportunity.



Introduction

By most indicators, the District of Columbia is a thriving, dynamic city. Yet, the District's long-term economic vitality will require a highly rated education system able to produce a workforce skilled enough to meet the demands of a 21st-century, global marketplace. Recent polls reveal that a majority of District residents believe that improving the education system should be policymakers' top priority.¹

Fueling the public's concerns are the lingering academic challenges faced by District of Columbia Public Schools (DCPS). According to 2005 test results, only 10 percent of fourth-grade students were proficient in reading and only 6 percent of sixth graders were proficient in math. By high school, these poor outcomes resulted in a graduation rate of only 59 percent. The District is failing to prepare 40 percent of its young people for today's competitive marketplace.² In a June article in the *Washington Post's* Close to Home section, Barbara Lang, President of the DC Chamber of Commerce wrote, "Preparing our workforce is essential, and that process begins with our DC Public Schools, so that we don't continue to add to the pool of unprepared workers."³

While there is no simple solution to these issues, high-quality pre-kindergarten for all of the District's three and four year olds is the first step toward reliable, effective public school reform. Decades of painstaking scientific research indicate that high-quality pre-k programs provide the necessary foundation for strong academic outcomes. Children who attend high-quality pre-k programs are consistently found to outperform their peers on standardized tests, are less likely to be referred to special education or be retained in school, and, ultimately, are more likely to graduate from high school and go to college.⁴

These benefits make pre-k one of the most cost-effective investments a government can make. Carefully researched studies such as the Perry Preschool Project and the Abecedarian Early Childhood Intervention, demonstrated high returns in government cost-savings and increases in human and social capital.

District policymakers and community leaders have long understood the potential of pre-k. In fact, in the early 1970s, DC became one of the first jurisdictions to create a publicly funded pre-k program, and today, DC provides early childhood services to an exceptionally large proportion of its children. However, 2,000 three and four year olds still lack access to publicly funded pre-k and 80 percent of available programs do not meet the quality standards of the National Association for the Education of Young Children (NAEYC).

Investing in the Economic Vitality of the District of Columbia through Pre-K for All analyzes the additional investments necessary to reach a threshold of quality sufficient to realize the social and academic benefits promised by early education research. Achieving this threshold requires closing the pre-k quality gap and enrolling at least 1,000 currently unserved children in high-quality programs. By providing the funding and support needed to reach this threshold of quality, the government of the District of Columbia will be investing in the foundation of meaningful school reform and long-term workforce development.

This report includes the following analyses: First, the pre-k quality gap is examined, and recommendations on components for a new high-quality system are offered. Second, the costs and benefits of closing the pre-k quality gap are detailed. Third, these costs and benefits are compared, and the results are expressed as a return on investment.

The report's results are clear. Additional investments are not only cost-effective for the city – they will improve the District's economic vitality and overall quality of life.

Closing the Pre-K Quality Gap

The District provides publicly-funded pre-k programs to an exceptionally high number of three and four year olds. These programs are provided in diverse settings including Head Start programs, District of Columbia Public Schools (DCPS), Public Charter Schools, and community-based subsidized child care programs.

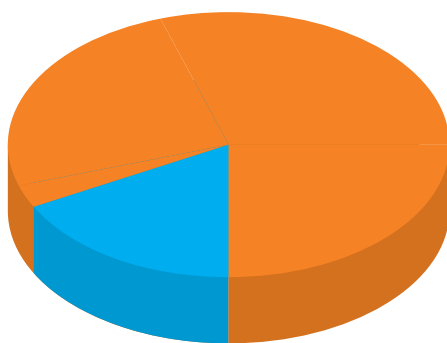
In order for a community to truly reap the educational and social benefits of pre-k, all children must attend programs that meet accepted standards of quality. In 2005, DCPS and the DC Department of Human Services, Early Care and Education Administration jointly created the Pre-K Incentive Program. This program embodies the following nationally-recognized components of quality:

1. A teacher in every classroom with a bachelor's degree and specialized training in early childhood education.
2. Equitable compensation and benefits for all teachers.
3. An age-appropriate, child-centered curriculum that develops language and learning skills, mathematical thinking, scientific inquiry, and social and emotional development.
4. A low adult-child ratio of 1:8 to allow for teacher-child interaction and individualized instruction.
5. A rigorous program-improvement and public-accountability system that includes child-outcome assessments, program evaluations, and comprehensive services.
6. System-wide implementation of quality accreditation standards such as those offered by the National Association for the Education of Young Children (NAEYC).

While there has been substantial improvement in recent years, a pre-k quality gap exists between the Pre-K Incentive Program and the vast majority of early education programs in the District. According to the Early Care and Education Administration, an estimated 80% of programs fail to meet quality accreditation standards.

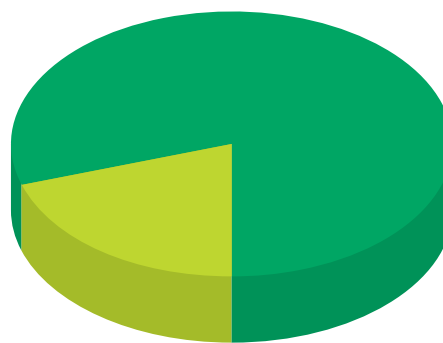
Inconsistencies in teacher qualifications between programs also comprise a large part of this quality gap. While all teachers in DCPS Pre-K have bachelor's degrees, while only 35 percent of teachers in community-based settings hold such a degree.

Figure 1:
Number of Publicly-Funded Pre-K Programs in the District of Columbia



- 83% **Access to Pre-K Programs**
 - 30% DCPS and Charter School Pre-K
 - 25% Head Start
 - 25% Community-based Subsidized Child Care
 - 3% Pre-K Incentive Program
- 17% **No Access to Pre-K Programs**

Figure 2:
Number of Publicly-Funded Pre-K Programs Meeting Quality Accreditation Standards



- 80% **Programs Not Meeting Standards**
- 20% **Accredited Programs**

Funding Quality Pre-K

In determining the level of investment necessary to close the quality gap, there are several costing approaches one can use. Accounting for District prices, this study identifies five possible approaches to ensuring all programs meet high-quality standards:

- a. A recent costing template for Illinois reports that pre-k is 1.52 times more expensive than traditional early care programs, with most of the additional funding spent on professional staff. However, this template only includes expenses for quality components numbers one through four from the list above. It does not account for accreditation and accountability costs.⁵ Adding in these costs, high-quality pre-k for the District would cost at least \$10,900 per child per year (more if health services are included).⁶
- b. A system emulating the most commonly cited model pre-k programs would incur annual per-child costs to the District of: \$12,600 (Perry Pre-School), \$6,300 (Chicago), or \$17,900 (Abecedarian).⁷ However, these figures do not include a comprehensive accountability system.
- c. States that provide a large amount of funding to pre-k programs may offer guidance on the amount to be spent in the District of Columbia. New Jersey is one of the highest-spending states: the cost to the District would likely be \$10,240 based upon the New Jersey statewide average, or \$12,000 based upon only the figures for the Abbott districts.⁸
- d. Education-cost functions provide a simple formula: expenditures on teachers are two-thirds of total program costs. Therefore, if 1.4 pre-k teachers are paid at the 2005 average K-12 wage of \$64,000 plus fringe benefits for a group of 15 children, then the average cost per child would be \$12,300. Adding in an accountability system would raise the cost to approximately \$13,200 per child.
- e. It may be legitimate to assume that the Pre-K Incentive Program is an optimal investment; the average per-child cost of pre-k would therefore be \$12,500.

Taken together, these costing approaches provide a reasonable framework for estimating the cost of high-quality pre-k in the District. To ensure high quality, including government accountability systems, the District should expect to spend approximately \$13,000 per child per year. This cost figure applies to new programs and to those currently offered in public and charter schools in the District.

In total, the District should increase spending by \$58.5 million to close the pre-k quality gap by upgrading existing programs and providing 1,000 more children with high-quality pre-k programming. Once the quality threshold is realized, the District of Columbia must make an additional \$13 million investment to bring the last 1,000 unserved children into the system. Any additional investments will yield a net return proportional to the return demonstrated in this study.



Calculating the Economic Consequences of Closing the Gap

The economic benefits created by closing the pre-k quality gap include efficiency gains to the school system, increased tax revenues, and lower government expenditures on crime, health, and welfare.

Other cost-benefit studies, such as the one conducted on the Abecedarian Early Childhood Intervention, include benefits to the participants and find a very high rate of return – as much as \$17 for every dollar invested. This study takes a conservative approach to calculating these benefits, counting only returns to the District government and not to the program participants themselves. It is to be expected that a program of similar quality will produce as many benefits to the participants in the District as did the Abecedarian model.

The benefits to the District are calculated based upon enrollment of an additional 1,000 children and upon programming quality upgrades for children in other programs. The benefits realized per child in upgraded programs will be weaker than those per new enrollees. We assume these benefits are one-third as strong for new enrollees (because they are receiving approximately one-third as much additional resource).

For each benefit to the government, the approach used is, again, a conservative one. Impacts and costs are based upon published studies and extant datasets, and District-level and local economic data are used where possible. To test for the sensitivity of these results, two models are calculated. Model One applies the expected relationships and is the “best estimate,” and Model Two applies even more cautious assumptions and should be regarded as a lower limit for the economic benefits. Findings in the text of this report reflect Model 1 data. Results for Model 2 are included in all charts and tables. As with the cost figures, all money values are reported in 2005 dollars and adjusted for the price index of the District. Future money streams are discounted using the standard rate of 3.5 percent.

Cost Savings to the School System

Investments in quality pre-k create three efficiency gains to the education system: rates of special education are lower; fewer children are retained in grade; and children are more proficient as learners.

Special education and grade retention are expensive. According to DCPS costs data, annual expenditures per student are \$11,682, and spending on special education is proportionately higher at \$22,313 (These figures do not include federal funds). Each student receives 13 years of District-funded public schooling. If children do not repeat a grade and are not placed in special education, over their 13 years of schooling they each receive present value expenditures of \$98,668. However, if they repeat a grade, that figure grows to \$107,457, and if they require special education services for all of those 13 years, the expenditure increases substantially to \$193,139. Total costs can be calculated based on the tracks these students follow.

Figure 3 shows the impact of the policy and the cost savings for a single age cohort of three year olds. Currently, 18.6 percent of children are in special education, 16.3 percent are retained for one year, and the remaining 75.1 percent follow the regular 13-year track. Expanded high-quality pre-k will change these proportions: special education will fall by 82 students or eight percent and grade retention will fall by 102 students or 12 percent. As a result, high-quality pre-k-for-all program would yield cost savings of \$7.8 million to special education budgets and \$0.9 million to grade-retention budgets.

High-quality pre-k improves children's school readiness, both academic and behavioral.” First, pre-k improves student behavior. Research indicates that teachers are less likely to quit or to be absent if their students are more proficient and less disruptive. Second, improved student behavior reduces the need for spending on security, policing, and custodial services to ensure safety and repair damaged property and on substance abuse, truancy, and absenteeism programs. Finally, if students who had high-quality pre-k are doing better in school, than districts save money on remediation programs. All of these effects have been documented using recent data on elementary schooling across the U.S.¹¹ The overall effect is to raise the productivity of learning by 13.5 percent.¹² These learning productivity gains are likely to be underestimated because they assume zero benefits to other personnel (e.g. principals and administrators).

continued on page 6

Figure 3:
Present Value Cost Savings from Reductions in
Special Education and Grade Retention

	Current Provision	Impacts from Proposed Policy	
		Model One	Model Two
Children Entering DCPS Kindergarten	5,400	5,400	5,400
Students per Category:			
Special Education	1,004	922	958
Regular Education (Repeats 1 Grade)	880	778	808
Regular Education (Not Repeating Grade)	3,515	3,700	3,634
Costs per Category:			
Special Education	\$ 193,139.00	\$ 193,139.00	\$ 193,139.00
Regular Education (Repeats 1 Grade)	107,457.00	107,457.00	107,457.00
Regular Education (Not Repeating Grade)	98,668.00	98,668.00	98,668.00
PV Total Cost for K-12 (\$ million)	\$ 635.43	\$ 626.78	\$ 630.37
PV Cost-savings (\$ million)			
From Special Education		\$ 7.75	\$ 4.43
From Lower Grade Retention		0.90	0.63

*Notes: Enrollment includes charter school students.
Present Value (PV) figures are discounted over the K-12 years
at a rate of 3.5 percent. Economic values are in 2005 dollars.*

Cost Savings to the School System

continued from page 5

As a result of these improvements, teacher job satisfaction is estimated to improve by 8 percentage points, equivalent to receiving a 4 percent salary increase.¹³ Based on 2005 data, the average annual District salary across the 5,704 public school teachers is \$64,482.¹⁴ Thus, an improvement in job satisfaction equivalent to a 4 percent raise spread across all K-12 years of schooling would generate present value cost savings of \$11 million.

Teacher turnover is predicted to fall by 12 percent.¹⁵ Annually, 16.3 percent of teachers in urban public school systems either leave the profession or change to a new school. This imposes costs on the District. The industry standard for the cost of turnover is 33 percent of one year's salary of the new hire.¹⁶ Reducing these costs by 12 percent would therefore generate a present value saving of \$1.8 million over the K-12 span.

Teacher absenteeism is expected to decline 10 percent. On average, school systems employ one substitute teacher for every 15 regular teachers. With a 10 percent reduction in substitute teaching, the school system would save \$1.83 million.

On average, schools spend 6 percent of their budgets on safety. An improvement in school safety would therefore save 1.2 percent of the total schools budget, or \$7.6 million.

Finally, all school districts allocate funds for remedial education. Given the improvement in academic achievement as a result of pre-k, it is expected that these funds would be released. The cost saving is estimated at \$230 per enrollee for a total of \$0.9 million.¹⁷

Overall, Figure 4 shows substantial savings to a school system when students start school more prepared and learn at a faster rate throughout their schooling. The total present value cost saving from implementing the proposed program is \$23.2 million.

Figure 4:
**Present Value Learning Productivity Cost Savings
for Educational Budgets (\$ Million)**

Learning Productivity Categories	Cost Savings for One Cohort of Three Year Olds	
	Model One	Model Two
Higher Teacher Job Satisfaction	\$ 11.01	\$ 5.69
Lower Teacher Turnover	1.82	0.94
Reduced Need for Substitute Teachers	1.83	0.95
Improved School Safety	7.63	3.81
Reduced Pressure for Remediation Programs	0.86	0.45
Total Cost Savings	\$ 23.15	\$ 11.84

Notes: Present value figures are discounted over the K-12 years at a rate of 3.5 percent. Economic values are in 2005 dollars.

Reductions in Child Healthcare Costs

Many studies have found that pre-k conveys benefits to child health and well being. First, children who attend high-quality pre-k are screened for health conditions, immunized, and receive improved nutrition.¹⁸

Second, children who attend high-quality pre-k have enhanced emotional and mental health. A recent study for inner-city children in Seattle found long-term, positive effects (e.g. reduced anxiety and social phobia and improved family relationships).¹⁹ Evidence from the Chicago program indicates that, for pre-k participants, rates of child maltreatment are lower and that, broadly, child-welfare levels are 13 percent higher than non-participants.²⁰ We use this last relationship as a conservative measure of the benefits to child health and welfare from enhanced pre-k education.

In turn, these impacts will affect reliance on welfare programs and health-support services.²¹ Within the DCPS, there are expenditures for school health care, intervention services, and mental health. In the Fiscal Year 2005, total annual expenditure on these items from local funds alone was \$20.6 million, a cost of \$340 per child per year. New or upgraded pre-k will reduce these costs by 13 percent for participating children, resulting in savings of \$2.3 million. In addition the DC government spends approximately \$770 per person on health-related services.²² Similarly, the anticipated 13 percent reduction in these costs as a result of improved and expanded pre-k services would generate savings of \$4.7 million.

These health-related cost savings are summarized in Figure 5. At \$6.9 million these figures are conservative. They exclude the possible benefits from improved health in adulthood.

Figure 5:
**Present Value Fiscal Impacts on
Child Health and Welfare (\$ Million)**

Fiscal Impacts Reduction in Expenditures	Impacts from Proposed Policy	
	Model One	Model Two
DCPS	\$ 2.28	\$ 1.71
DC Government	4.65	3.49
Total Cost Savings	\$ 6.93	\$ 5.20

Notes: Present Value (PV) figures are discounted at a rate of 3.5 percent. Economic values are in 2005 dollars.



Cost Savings to the Criminal Justice System

Pre-k programs have been shown to reduce crime by participants as they become juveniles and move into adulthood.²³ This effect is particularly important given the high crimes rate in the District of Columbia.

To generate an estimate of the impacts on crime, this analysis derives three separate measures and then takes the average cost saving. (Again, these are very conservative estimates because they only include the costs to the city and not the costs to the victims of crime; they also do not fully capture the costs of juvenile crime.) The three measures are calculated as follows:²⁴

The study of the Chicago Child-Parent Center found that the program generated present value savings of \$9,417 per participant in terms of juvenile and adult crimes averted.²⁵ Given that the Chicago program is considerably shorter than the program proposed here, this same figure is probably a conservative estimate of the gains to the District. Applying this figure to 1,000 new enrollees and one-third of the enrollees receiving upgraded services, the cost saving would be \$21.0 million.

Using Census data, Lochner and Moretti (2004) estimate that each additional high school graduate yields present value cost savings of \$19,414 (excluding victim costs and juvenile crime). Because this is a national estimate (i.e., based on the average U.S. crime rate), it is probably a conservative estimate for purposes of the District. We apply this figure to every additional high school graduate that a pre-k-for-all system will produce to yield a cost saving \$16.7 million.²⁶

The Perry Pre-School program crime estimates show considerable savings from pre-k; Belfield et al. (2004) report present value cost savings of \$76,293 per graduate. However, this program was targeted at a very high-risk group, and so, it is unlikely that the effects generalize to the District population. This method would yield cost savings of \$15.1 million.

The estimated cost-savings are shown in Figure 6. Overall, the fiscal consequences for the criminal justice system can be bounded reasonably narrowly. Taking the average, we estimate that the cost savings would be \$17.6 million.

Figure 6:
Present Value Fiscal Impacts on the Criminal Justice System (\$ Million)

Fiscal Impacts Reduction in Expenditures	Impacts from Proposed Policy	
	Model One	Model Two
Method (1): Chicago Data	\$ 21.03	\$ 16.82
Method (2): Census Data	16.73	13.38
Method (3): Perry Pre-school Data	15.11	12.08
Average	\$ 17.62	\$ 14.10

Notes: Victim costs are not included. Present Value (PV) figures are discounted at a rate of 3.5 percent. Economic values are in 2005 dollars.

Increases in Tax Revenues

Tax revenues are increased as a result of early childhood education programs: families can more easily enter the labor market; and the pre-k participants themselves will enter adulthood as more productive workers. Both effects raise incomes, increasing income and consumption tax payments proportionately. The fiscal effects are summarized in Figure 7.

As a result of the additional time saved on caring for their children, each family is freed up to participate in the labor market. From studies examining the relationship between early childhood availability and working, families with a child in pre-k are estimated to have average increased earnings of \$2,409 in total over the two years.²⁷ With a tax rate of 30 percent the extra tax revenues for the District amount to \$2.28 million.

For the pre-k participants themselves, the effects on earnings are derived from the effects on educational attainment. This study estimates that currently, in Washington DC, 40 percent of students drop out of high school each year.²⁸ Because high-quality pre-k programs have dramatic, positive effects on high school graduation rates, the proposed policy will significantly reduce this dropout figure. For the cohort who experience new pre-k opportunities, the dropout rate should fall by 25 percent and for those who experience higher-quality pre-k, the reduction should be 9 percent.²⁹ The result will be 220 fewer high school dropouts over twelve years as well as 3,500 children who will have received one additional year of education.

These improved educational outcomes generate much higher incomes for the participants, and in turn higher tax revenues for the city. Recent calculations by Rouse (2005), using the Current Population Survey, show that each new high school graduate is expected to earn over \$300,000 more in present value dollars during their lifetime. Taking college progression into account and the higher wages in the District, the net present value tax gain per additional predicted high school graduate is \$68,000.³⁰ In the aggregate, this is worth \$13.6 million. In addition, each year of education (for those who would have graduated anyway) correlates to a 10 percent increase in annual earnings and, so, 2.5 percent more in tax revenues. Conservatively, this amounts to \$11.2 million in additional tax revenues.

Figure 7:
Present Value Fiscal Impacts on
Tax Revenues (\$ Million)

Increases in Tax Revenues	Impacts from Proposed Policy	
	Model One	Model Two
Family Earnings	\$ 2.28	\$ 1.71
Participant Earnings:		
New High School Graduates	13.59	12.79
Additional Schooling	11.20	6.72
Total Cost Savings	\$ 27.07	\$ 20.22

Notes: Present Value (PV) figures are discounted at a rate of 3.5 percent. Economic values are in 2005 dollars.



Closing the Pre-K Quality Gap is Cost Effective

To evaluate the economic merit of this proposal, the costs and benefits were compared. Figure 8 is a summary of this comparison. The cost of the proposed high-quality pre-k program for all DC three and four year olds is \$58.5 million and the benefits are \$81.5 million; a net present value return of \$23 million. Even using the extremely conservative assumptions of Model Two, the program would approximately pay for itself and thus remain cost effective.

The returns on a pre-k-for-all investment are spread over several decades, as the children grow up, receive their education, and become productive citizens. Figure 9 shows the breakdown of the benefits over time. In the short run, i.e., within the first four years of the investment, the District will garner \$6.1 million, or 8 percent of the total benefits. Though only 8 percent of anticipated fiscal benefits, this figure is equivalent to 10 percent of the total initial investment, meaning that within the first four years, the District will recoup approximately 10 cents of every dollar invested.

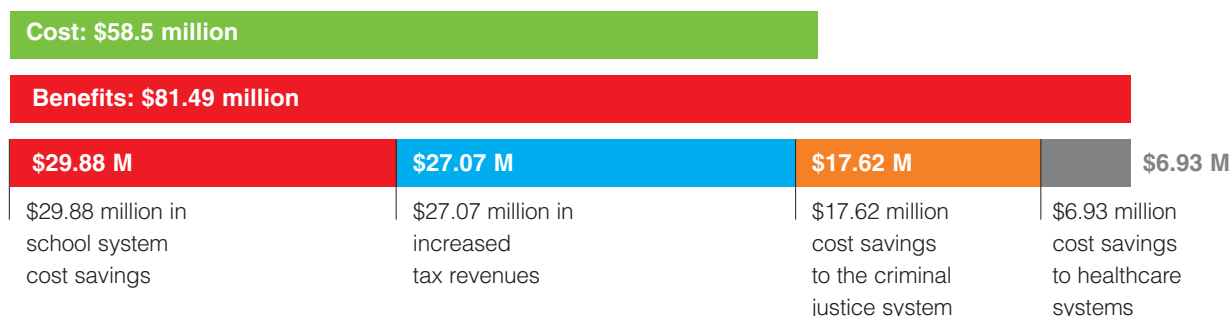
Returns on the city's investment will increase as children move through the school system and into adulthood. Figure 9 illustrates that the majority of pre-k-related cost benefits begin to be realized when children are in fourth grade and increase until they are adults. This pattern reflects the fact that education is an investment, not just in children, but also in their future as working adults.

Figure 9:
Time Horizon of Benefits from Pre-K Investments

Fiscal Impacts	Time Profile of Benefits			
	Model One		Model Two	
Short-Run Benefits (within 4 years of investment)	\$ 6.11	8%	\$ 4.26	8%
Medium-Run Benefits (after short run until end of high school)	\$34.73	43%	\$20.01	35%
Long-Run Benefits (after medium run)	\$40.65	49%	\$32.19	57%
Benefits	\$81.49	100%	\$56.47	100%

Notes: Economic values are in 2005 dollars.

Figure 8:
Quality Pre-K for All is Cost Effective



Increasing Momentum Toward Pre-K for All

The District of Columbia has a legacy of leadership in early education. Since 1972, public pre-k has been available for four year olds on a first-come-first-served basis. In recent years, the Council of the District of Columbia has increased funding to serve more three and four year olds.

In 2002, a coalition of early childhood and K-12 advocates came together under the banner of the Universal School Readiness Stakeholder Group to promote public knowledge, will, and action in support of pre-k for all.

The Stakeholder Group has worked in collaboration with the National Black Child Development Institute's SPARK DC initiative to ensure that all children enter school ready to learn. In 2004, advocates submitted a "Roadmap to Universal School Readiness in the District of Columbia" to the mayor that laid the groundwork for future investments in pre-k for all. These combined efforts have resulted in the Pre-K Incentive Program, an exemplary prototype of high quality that is funded by the DC Public Schools and administered by the DC Department of Human Services, Early Care and Education Administration.

The Pre-K for All DC campaign is an outgrowth of these efforts. Over the next several years, the campaign will engage the general public and policymakers in an education and advocacy campaign to ensure that every three and four year old has access to high-quality pre-k programs.

A Call to Action

The vision that all District children will enter school ready to learn and prepared for success in life can only be realized through the collective action of all our citizens. By becoming Pre-K Champions, business and foundation leaders, education advocates, and elected officials can play major roles in supporting the Pre-K for All DC campaign.

The business and foundation community should first embrace pre-k as a sound, research-based community-development strategy and, second, to integrate pre-k into the District's economic agenda.

Education advocates must continue to promote high-quality pre-k as a critical part of the school-reform agenda.

Elected officials should make pre-k for all three and four year olds a legislative and budgetary priority.

Families and the community at-large must become advocates for all children and hold elected officials accountable for creating a quality pre-k-for-all system.



Endnotes and Acknowledgements

Endnotes

- ¹ Two recent Washington Post polls found education to be a top priority for District residents. *The Washington Post*, May 24, 2006; Page A01. *The Washington Post*, July 23, 2006; A01.
- ² This estimate is the lower bound from Swanson (www.urban.org/410843_keeping_count.pdf, 2004) and Warren (epaa.asu.edu/epaa/v13n51/v13n51.pdf, 2004). See also NCES figures available at: nces.ed.gov/pubs2005/dropout2001/tab_fig.asp.
- ³ *The Washington Post*, June 11, 2006; B08.
- ⁴ The benefits of high-quality pre-k programs: Chicago Longitudinal Study, "State Efforts to Evaluate the Effects of Pre-Kindergarten", Yale University Child Study Center, The Carolina Abecedarian Project, The High/Scope Perry Preschool Project, "The Economics of Investing in Universal Preschool Education in California", Rand Corporation; The High/Scope Perry School Project, and "The Head Start Family and Child Experiences Survey", U.S. Department of Health and Human Services.
- ⁵ Golin, SC, Mitchell, AW, and B Gault. 2003. *The Price of School Readiness: A Tool for Estimating the Cost of Universal Preschool in the States*. Working Paper, www.iwpr.org/pdf/G713.pdf. This cost is based on 1 director, 1 assistant, 4 teachers, 6 assistant teachers, and 1 specialist for 80 children in groups of 20.
- ⁶ Barnett and Robin (2006) propose parity for pre-K with K-12 expenditures, i.e. making sure that the District allocates as much funding to pre-school as K-12. Presently, the District already equates these levels.
- ⁷ Author's calculations, based on Temple J and AA Reynolds. 2006. Benefits and costs of investments in preschool education: Evidence from the Child-Parent Centers and related programs. *Economics of Education Review*, forthcoming.
- ⁸ See 2005 NIEER Yearbook. For the Abbott districts, see Applewhite, E and L Hirsch. 2003. The Abbott pre-school program. Fifth year report on enrollment and budget. Education Law Center, Newark, www.edlawcenter.org.
- ⁹ Research literature includes reduction of special education effects of between 6% and 48% (Reynolds et al., 2000; Barnett, 1996); the average effect is 21%, and the CDCP (2002) reports a representative estimate of 12%.
- ¹⁰ <http://nces.ed.gov/pubs/dp95/97473-5.asp>
- ¹¹ Belfield, CR. 2005. The promise of pre-school. Working Paper, Teachers College, Columbia University.
- ¹² This factor is calculated as follows. The new pre-school group yields achievement gains of 0.25sd and the upgraded pre-school yields gains of 0.1sd. In addition, there are peer effects of one-quarter of these direct effects. However, the overall effect is aggregated across all students in DCPS, not just those who enrolled in new or upgraded pre-school.
- ¹³ Heywood, J, Siebert, S and X Wei. 2002. Worker sorting and job satisfaction: The case of union and government jobs. *Industrial and Labor Relations Review*, 55, 595-608. From direct analysis of the Schools and Staffing Survey (2000), teachers reporting their school has a serious vandalism problem are paid 3.7% more.
- ¹⁴ <http://www.aft.org/salary/2004/download/2004AFTSalarySurvey.pdf>.
- ¹⁵ Iverson, RD and DB Currivan. 2003. Union participation, job satisfaction, and employee turnover: An event history analysis of the exit-voice hypothesis. *Industrial Relations*, 42, 101-105. From direct analysis of the Schools and Staffing Survey (2000), teachers reporting their school has a serious vandalism problem are 40% more likely to quit; other staff are also more likely to quit as the school becomes more dangerous.
- ¹⁶ NCES Digest (2004, Table 74); www.sbec.state.tx.us/SCECOnline/txbess/turnoverrrpt.pdf
- ¹⁷ The DCPS spends over \$5.5 million annually on intervention services, bilingual services, and extended day services. However, the District budget does not clearly itemize spending on remedial programs, so we apply estimates from Delaware (www.state.de.us/budget/budget/fy2006/operating/06opbudbill.pdf).
- ¹⁸ Center for Disease Control and Prevention. 2002. Community interventions to promote healthy social environments. Early childhood development and family housing, *MMWR*, 51. Smokowski, PR, Mann, EA, Reynolds, AJ, and MW Fraser. 2004. Childhood risk and protective factors and late adolescent adjustment in inner city minority youth. *Children and Youth Services Review*, 26, 63-91.

- ¹⁹ McCarton, CM, Brooks-Gunn, J, Wallace, IF and CR Bauer. 1997. Results at age 8 years of early intervention for low birth-weight premature infants. *Journal of the American Medical Association*, 277, 126-132; Hawkins, JD, Kosterman, R, Catalano, RF, Hill, KG, and RD Abbott. 2005. Promoting positive adult functioning through social development intervention in childhood. *Archives of Pediatrics and Adolescent Medicine*, 159, 25-31; Schulman, K and WS Barnett. 2006. What impacts does pre-school have on personal responsibility and related social behavior? Working Paper, www.nieer.org.
- ²⁰ Reynolds, AJ, Ou, S and JD Topitzes. 2004. Paths of effects of early childhood intervention on educational attainment and delinquency: A confirmatory analysis of the Chicago Child-Parent Centers. *Child Development*, 75, 1299-1238.
- ²¹ Newacheck, PW and SE Kim. 2005. A national profile of health care utilization and expenditures for children with special health care needs. *Archives of Pediatrics and Adolescent Medicine*, 159, 10-17.
- ²² http://cfo.dc.gov/cfo/frames.asp?doc=/cfo/LIB/cfo/budget/2005/pdf/pbfp05_e_hss.pdf.
- ²³ The causal mechanism may be either behavioral or financial: pre-school increases attainment which may directly influence criminal predispositions or indirectly raise earnings potential and so the opportunity cost of committing crime. See Farrington, DP. 2003. Developmental and life-course criminology: Key theoretical and empirical issues. *Criminology*, 41, 221-246.
- ²⁴ For Model {2} we (arbitrarily) assume the impacts are only 80% of those derived from the three methods.
- ²⁵ Reynolds, AJ, Ou, S and JD Topitzes. 2004. Paths of effects of early childhood intervention on educational attainment and delinquency: A confirmatory analysis of the Chicago Child-Parent Centers. *Child Development*, 75, 1299-1238.
- ²⁶ Lochner, L and E Moretti. 2004. The effect of education on crime: Evidence from prison inmates, arrests, and self-reports. *American Economic Review*, 94, 155-189; Miller, T, Fisher, D and M Cohen. 2001. Costs of juvenile violence: policy implications. *Pediatrics*, 107, 44-60.
- ²⁷ Belfield, CR, Nores, M, Barnett, WS, and L Schweinhart. 2005. Cost-benefit analysis of a randomized field trial of early childhood education: the High/Scope Perry Pre-School Program. *Journal of Human Resources*, 46, 162-185.

- ²⁸ This estimate is the lower bound from Swanson (www.urban.org/410843_keeping_count.pdf, 2004) and Warren (epaa.asu.edu/epaa/v13n51/v13n51.pdf, 2004). See also NCES figures available at: nces.ed.gov/pubs2005/dropout2001/tab_fig.asp.
- ²⁹ This reduction is actually a conservative estimate. See Barnett, WS and CR Belfield. 2006. Early childhood education and social mobility. *Futures of Children*, forthcoming.
- ³⁰ Rouse, CE. 2005. The costs of inadequate education. Working Paper, Teachers College devweb.tc.columbia.edu/manager/symposium/Files/77_Rouse_paper.pdf. See also www.ced.org/docs/report/report_ivk_toikka_2004.pdf. For Model {2}, Census data is used, which yields an earnings gain for dropouts of \$215,000.

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Technical Report
